

## The Relation of a Mother's Dental Health Behavior and the Severity of Dental Black Stain in Children 4–8 Years Old

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### Abstract

Dental black stain is an external discoloration caused by a dark-pigmented exogenous substance in the form of a black line or dots firmly attached on the cervical third of crown teeth on the labial/buccal and lingual/palatal surfaces and spreading into the proximal surfaces. The mother's dental health behavior, which consists of the mother's knowledge, attitudes and actions, have been suspected of affecting the severity of dental black stain in children. The aim of this study is to determine the relationship of the mother's dental health behavior with the severity of dental black stain in children age 4–8 years. Subjects are 21 children aged 4–8 years old with dental black stain. The results showed that there were no significant relations between the mother's dental health behavior and the severity of dental black stain.

*Clinical article (J Int Dent Med Res 2018; 11(1): pp. 197-201)*

**Keywords:** Children with black stain, mother's behavior, severity of dental black stain.

**Received date:** 20 September 2017

**Accept date:** 25 October 2017

### Introduction

Dental discoloration or dental stain is any change in the hue, color, and translucency of the tooth due to various cause, which is frequently found on the surface of the teeth and can cause clinical and aesthetic problems.<sup>1,2</sup> Currently the number of cases of dental discoloration in children is on the increase, accompanied by an increasing awareness of parents to related aesthetic problems. Nowadays, aesthetic problems have become one of the most important aspects that are considered, both by children and parents, in terms of dental health. The higher the severity of dental discoloration the greater the influence on the aesthetic quality is. The severity of dental discoloration can be seen from the expansion of the stain on the tooth surface.<sup>3</sup>

Types of dental discoloration can be classified based on causative factors, which are the extrinsic factor, intrinsic factor, and internalization factor. Extrinsic discoloration is

discoloration due to extrinsic factors, located in the outer tooth surface, such as the deposit of substances (metals and non-metals), the presence of chromogenic bacteria, or acquired pellicle, which is also influenced by basic color or chemical interactions on the surface of the tooth. Intrinsic discoloration is discoloration due to intrinsic factors, resulted from the deposits of pigments in the dental structures, such as the effect of systemic conditions, congenital factors, and inherited conditions. Internalization discoloration is the incorporation of the extrinsic discoloration on the tooth by a substance following the development of the teeth.<sup>1,3,4</sup>

Dental discoloration will show different colors based on the causes, clinical features, compositions, locations, severities, and levels of adhesion of a substance to the tooth surface.<sup>1</sup> One color variation of dental discoloration is black stain. Black stain can be diagnosed clinically as dots, lines, or a continuous line of black pigmentation at the third cervical margin of the tooth crown on the labial/buccal enamel surface, or the lingual/palatal enamel surface, which then spreads to the proximal surface of the tooth. Black stain is regarded as a special form of dental plaque because it contains calcium and phosphate in large amounts as well as insoluble iron salt (ferric sulfide).<sup>5</sup> Black stain usually cannot be removed with regular oral hygiene procedures (such as tooth brushing, rinsing,

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flossing, etc.), but has need of professionals and specific instruments.<sup>6</sup> In accordance with the pedodontic treatment triangle concept, the treatment and maintenance of the dental health of children involves children (patients), parents (especially mothers), and a dentist, as well as the social environment.<sup>7</sup> The oral and dental health care of children still depends on their parents, especially mothers, because the mother is regarded as the closest person who can guide them to have an appropriate oral health.<sup>8</sup>

Health behavior is actions of individuals, group, and organizations that relate to health maintenance, health restoration, and health improvement.<sup>9</sup> Oral health behavior can be improved by oral health education which is providing a variety of learning experiences.<sup>10</sup> Learning process consists of three main domain, which are knowledge (cognitive), attitude (affective), and action (psychomotor).<sup>11</sup>

The mother's behavior regarding to dental health can affect the oral hygiene and oral health of the children, thus can predict their dental and gingival health status.<sup>10</sup> Therefore, the behavior, which consists of knowledge, attitude, and action domains of the mother on oral and dental health, will determine the oral and dental health of the children. Based on the matters above and the lack of study on the relation of the mother's behavior with dental black stain, the authors are interested to determine the relation of the mother's behavior with the severity of dental black stain in the children. The research will be conducted on mothers and children aged 4–8 years old.

### Materials and methods

The study design used by the researchers is descriptive correlative because we wanted to determine if the relation of the mothers' behavior, which consists of knowledge, attitude, and action domains regarding dental health, is related to the severity of the dental black stain in children aged 4–8 years old. The study was conducted using a cross-sectional analytical approach. The sampling technique used for this study is consecutive sampling, and all subjects that suited the inclusion criteria were included in the choice of subjects until the required subjects were fulfilled. The type of data in this study consisted of primary data. The subjects in this study were children aged 4–8 years old with dental black

stain and their mothers. The total subjects for this study were 21 pairs of mothers and children. This study took place in five elementary schools and one kindergarten in Jakarta.

The study was conducted through a clinical examination and distribution of a questionnaire to the mothers of children with dental black stain. Clinical examinations were performed to select children who had dental black stain among all the students aged 4–8 years old, which were allowed to be examined. In addition, the severity of dental black stain of the students included in the inclusion criteria was measured. The questionnaire was distributed to get the knowledge, attitude, and action data of the mothers regarding the dental health of the children. Prior to that, informed consent forms were given to all the students' parents to get the permission for conducting the examination and asking the participation of the child in this study, if the child was included in the inclusion criteria.

Data analysis was performed by way of statistical testing with a computer-based program. The test that was used is Spearman's R test with  $\alpha = 0.05$  (95% significance level). Spearman's R test is used because both types of data used were non-parametric data with an ordinal scale, selected with the aim of reviewing the correlation/relation between the knowledge, attitude, and action of mothers regarding dental health with the severity of dental black stain in children aged 4–8 years old.

### Results

The subjects of this study, which were included in the inclusion criteria, were 21 of the 378 children, so we could say the prevalence of dental black stain in children aged 4–8 years old was 6%, with an average age of 6.2 years.

The correlation test results in Table 2 measuring the level of the mother's knowledge about the dental health of her child with the severity of dental black stain showed that the level of the mother's knowledge about dental health had a relation that is not significant ( $p > 0.05$ ), and this was shown as well with the correlation coefficient of 0.225, which was classified as being in the low category.

Characteristic	Category	Frequency (n)	%
Gender of Children	Male	15	71
	Female	6	29
UHT Milk Consumption	Yes	19	90
	No	2	10
Age of Children	4 years old	3	14
	5 years old	2	10
	6 years old	7	33
	7 years old	5	24
	8 years old	4	19
Type of Children's Toothbrush	Children	20	95
	Adult	1	5
Caries	Yes	5	24
	No	16	76
Using of Fluoride Toothpaste	Yes	16	76
	No	5	24
Mothers' Working Status	Work	11	52
	Does Not Work	10	48
Mothers' Education Level	High School	7	33
	> High School	14	67

**Table 1.** Characteristics of the subjects

The Level of Mothers' Knowledge	The Severity of Dental Black Stain						Total		P value	C C
	Severe (Score 3)		Moderate (Score 2)		Mild (Score 1)		N	%		
	N	%	N	%	N	%				
Good	12	57	2	10	5	24	19	10	0.32	0.0
Adequate	-	-	-	-	-	-	-	-	7	22
Poor	2	10	-	-	-	-	2	-	-	5

**Table 2.** The Relation of the Mother's Knowledge about Children's Dental Health with the Severity of Children's Dental Black Stain. \*Significant P value  $\leq 0.05$

Level of The Mother's Attitude	Severity of Dental Black Stain						Total		P value	C C
	Severe (Score 3)		Moderate (Score 2)		Mild (Score 1)		N	%		
	N	%	N	%	N	%				
Good	14	67	2	10	5	24	21	10	0.00	0.0
Adequate	-	-	-	-	-	-	-	0	1	00
Poor	-	-	-	-	-	-	-	-	-	1

**Table 3.** Relation of the Mother's Attitude about Children's Dental Health with the Severity of Children's Dental Black Stain. \*Significant P value  $\leq 0.05$

The correlation test results in Table 3 measuring the level of the mother's attitude about the dental health of children with the severity of dental black stain showed that the mother's attitude about dental health had a significant relation ( $p < 0.05$ ), and had a correlation coefficient of 0.001, which was classified as being in the very low category.

Level of The Mother's Attitude	Severity of Dental Black Stain						Total		P value	C C
	Severe (Score 3)		Moderate (Score 2)		Mild (Score 1)		N	%		
	N	%	N	%	N	%				
Good	8	33	2	10	2	10	12	10	0.90	0.0
Adequate	3	12	-	-	2	10	5	0	3	02
Poor	3	12	1	5	-	-	4	-	-	8

**Table 4.** Relation of the Mother's Action about Children's Dental Health with the Severity of Children's Dental Black Stain. \*Significant P value  $\leq 0.05$

The correlation test results in Table 4 measuring the level of the mother's action about the dental health of children with the severity of dental black stain showed that the mothers' action about dental health had a relation that is not significant ( $p > 0.05$ ), and this is shown as well with a correlation coefficient of 0.028, which was classified as being in the very low category.

## Discussion

The following behavior domains are analyzed in this study: (1) mother's knowledge about dental health in connection with the severity of dental black stain in children aged 4–8 years old did not have a significant relation; (2) mother's attitude about dental health in connection with the severity of dental black stain in children aged 4–8 years old did have a significant relation, though the value of the correlation is very weak; (3) mother's action about dental health in connection with the severity of dental black stain in children aged 4–8 years old did not have a significant relationship.

Prevalence can vary depending on the different locations where the study is done, as these reflect the different habits and lifestyles of the population. Additionally, several variations of dental black stain diagnostic criteria may also affect the prevalence data. Children who consume UHT milk are more often exposed to dental black stain, possibly because the UHT milk contains minerals such as calcium, magnesium, and so on.<sup>12</sup> Some studies state that the mineral calcium found in dental black stain is in large amounts and it is suspected that magnesium can cause dental black stain.<sup>5</sup> Children who use the child's type of toothbrush are more frequently exposed to dental black stain compared to children who use an adult toothbrush. This is possibly because the level of children's dental hygiene will be better when using the appropriate type of toothbrush (toothbrushes for children). The good level of dental hygiene usually showed good pH and high pH can increase and/or form dental black stain.<sup>13</sup>

Children with dental black stain mostly do not have dental caries, possibly because the calcium and phosphate levels are high and the pH is good, which provides good resistance to caries.<sup>13</sup> Children who use fluoride toothpaste more often are exposed to dental black stain, possibly because the presence of fluoride means a higher pH of saliva and the amount of minerals in saliva also increases. The use of fluoride is said to increase and/or form dental black stain.<sup>3</sup> Children with mothers' education level > High School are more often exposed to dental black stain, possibly because mothers who have 12 years of education are said to have a child with a low health risk, high health promotion, high social support, and high medical care consumption.<sup>14</sup>

According to the results of the data analysis by the Spearman's R test, the mother's knowledge about the dental health in connection with the severity of dental black stain had no statistically significant relation, the mother's attitude about the dental health in connection with the severity of dental black stain did have statistically significant relation, with the value of the correlation being very low, and the mother's action regarding the dental health in connection with the severity of dental black stain had no statistically significant relation. Accordingly, we concluded that the mother's behavior regarding dental health in regard to the severity of dental black stain had no significant relation. The cause of either non-significant or significant relation with the low value of the correlation was possibly because of the lack of the subjects' prevalence, the cross-sectional analytical study approach method, which can involve recall bias, and the possibility that measurements were insufficiently precise, considering that the questionnaire was not filled out on the spot but submitted after a few days.

The number of subject might also limit the external validity. Such questionnaires can be affected by other factors, such as searching for answers on the internet, asking a dentist acquaintance/friend, and so on, so the contents of the questionnaire become less appropriate to the existing/actual situation. After considering the results of the study, the researchers suggest that further research needs to be carried out by using another study approach method and another way of measuring the knowledge, attitude, and action of the mothers; for example: a cohort study approach by interview measurement. In addition, the type of questionnaire can also be changed for the better by focusing on the question of the mother's knowledge, attitude, and action regarding dental black stain. In the meantime, because no clear etiology has yet been found, the dental black stain of pedodontic patients can be overcome by periodic cleaning at the dentist's office.

## Conclusions

Based on the study results and discussion above, it can be concluded that in general the mother's behavior regarding dental health in connection with the severity of dental black stain in children aged 4–8 years old had no relation.

## Declaration of Interest

The authors report no conflict of interest.

## References

1. Indarti I, Rustan Y, Budiarjo S. Identification Quantity of Actinomyces in Children Saliva with Black Stain in Tooth Enamel Surface. *International J Clin Prev Dent*. 2013;9(3):163-8.
2. Ingle, John I, et al. *Ingle's Endodontics 6*. Hamilton: BC Decker Inc. 2008: 1383-1384.
3. Zyla T, Kawala B, Antoszezowska-Smith J, et al. Black Stain and Dental Caries : A Review of the Literature. *Hindawi Publishing Corp*. 2015;1-6.
4. Schemel-Suárez M. Dental pigmentation and hemochromatosis: A case report. *Quintessence International*. 2017;48 (2), 155-159.
5. Amit T, Srivastava BK, Ramesh N, et al. An Investigation into Black Stain Among School Children in Chakkar Ka Milak of Moradabad City, India. *J Oral Health Comm Dent*. 2009;3(2):34-7.
6. Ronay V, Attin T. Black Stain- A Review. *Oral Health Prev Dent*. 2011;9(1):37-45.
7. McDonald RE. *Dentistry for the Child and Adolescent 10<sup>th</sup> ed*: St Louis, CV Mosby Co. 2011.
8. Moghadam MHB, Azad MM, Biriya M, Sabour S. Evaluation of oral hygiene care of under 4 years old children by their mothers based on the Health Belief Model. *Journal of Dental School*. 2015; 33(1): 9-18.
9. Karen J, Rimer BK, Viswanath K [Editors]. *Health Behavior and Health Education, Theory, Research, and Practice*, 5th Edition. San Francisco, Jossey-Bass, A Wiley Imprint. 2015.
10. Darwita RR, Rahardjo A, Andreas P, Maharani DA. The Behavior Change on Brushing Teeth of Children by Mothers Using a Periodic Dental Health Evaluation Card. *International Dental and Medical Research*. 2016;9(Special Issue): 277-281.
11. Kasilingam G, Ramalingam M, Chinnavan E. Assessment of Learning Domains to Improve Student's Learning in Higher Education. *Journal of Young Pharmacists*. 2014; 6 (1), 27-33.
12. Gedam K, Prasad R, Vijay VK. The Study on UHT Processing of Milk: A Versatile Option for Rural Sector. *World J Dairy Food Sci*. 2007;2(2):49-53.
13. Takashima Y, Matsumi Y, Yamasaki Y, et al. (2014). Black Pigmentation in Primary Dentition : Case Report and Literature Review. *Ped Dent J*. 2014;24:184-8.
14. Mangrio E, Hansen K, Lindstrom M, et al. Maternal Educational Level, Parental Preventive Behavior, Risk Behavior, Social Support and Medical Care Consumption in 8 Month-Old-Children in Malmo, Sweden. *BioMed Central Ltd*. 2011:891.